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September 15, 2021

Myra Reece
Director of Environmental Affairs
South Carolina Department of Health and Environmental Control
2600 Bull Street
Columbia, South Carolina 29201
reecemc@dhec.sc.gov

Subject: Request for Approval – Steam Stripper Optimization Trial, New-Indy Catawba LLC, York County

Dear Ms. Reece:

On behalf of New-Indy Catawba LLC (New-Indy), Design Group is requesting approval for the New-Indy Mill (the Mill) to evaluate different operating scenarios to optimize the throughput capacity of the steam stripper. This letter describes the planned stripper maintenance and the proposed steam stripper optimization trials. The ultimate goal of the stripper optimization trials is to identify stripper operating conditions that will reduce the impact of total reduced sulfur (TRS) odors on the community.

STEAM STRIPPER MAINTENANCE

Prior to the steam stripper optimization trials, the Mill is planning to conduct routine maintenance of the steam stripper and associated heat exchangers to remove scaling and fouling which over time has reduced stripping capacity. This maintenance will take place over an eight-day period, currently scheduled for September 18-26, 2021. During this time, the pulp mill will be operating and the ASB will be used as the sole treatment device for pulping process condensates (foul condensate). Per 40 CFR § 63.446(g), steam stripper control devices are allowed up to 10% excess emissions on a semi-annual reporting basis (eight days comprises 4% of the semi-annual operating period). An overview of the Mill foul condensate treatment system is provided in Attachment 1.

Odor Considerations during Steam Stripper Maintenance

The Mill plans to take preventative steps to minimize odor emissions from foul condensate treatment at the ASB during the steam stripper maintenance shutdown. These measures are outlined below.

- During the shutdown, the Mill will add supplemental oxygen to the ASB inlet ditch at the rate of 3,600 lbs/day.
- During the shutdown, the Mill will add 1 gpm of hydrogen peroxide to the ASB inlet ditch.
- All 52 available aerators at the ASB will be operating during the shutdown.
- The Mill has submitted a trial request to inject hydrogen peroxide into the foul condensate hardpipe. The injected hydrogen peroxide will pre-treat and oxidize sulfide odor-generating compounds before they reach the ASB.
- A hydrogen peroxide injection rate of 1 gpm into the foul condensate hardpipe is adequate to treat the anticipated sulfide loading to the ASB during the steam stripper shutdown.

Calculations are provided in Attachment 2.

The Mill has engaged consultants to quantitatively model the impact of treating foul condensate in the ASB on H2S emissions during this period. Preliminary calculations indicate that with these above measures in place, no additional TRS emissions from foul condensate treatment at the ASB during the stripper maintenance are expected. The Mill expects to provide a final version of the quantitative H2SSIMS model that reflects all of the measures proposed above to you within the next two days. While increased TRS odors are not expected, the Mill proposes to monitor oxygen reduction potential (ORP) of the foul condensate post-peroxide addition. If ORP becomes negative, the Mill will increase the hydrogen peroxide injection rate to the hardpipe.

HAP Destruction Compliance during Steam Stripper Maintenance

During the July 9-11, 2021 Initial Performance Testing compliance demonstration, an average of 1.05 MGD of foul condensate was collected and treated. During the demonstration, approximately 68% of the foul condensate flow was treated with the steam stripper, and the 32% balance was treated at the ASB. The IPT compliance demonstration showed that the ASB destructed on average 88.8% of the hazardous air pollutants (HAP) sent for treatment. During the July IPT compliance demonstration, 37 of 52 aerators at the ASB were in operation.

HAP destruction levels at the ASB during the steam stripper shutdown are expected to remain in compliance as 15 additional aerators have come online since July 11, 2021. Currently, all 52 aerators at the ASB are operating. The addition of supplemental oxygen to the ASB inlet ditch, hydrogen peroxide at the ASB inlet ditch, and hydrogen peroxide injection into the foul condensate hardpipe for odor mitigation are expected to also aid in the treatment of HAPs.

The Mill has engaged consultants to quantitatively model the impact of the full stream of foul condensate HAPs at the ASB. Preliminary calculations indicate that with the measures in place, HAP destruction levels will be in compliance during the shutdown. The Mill expects to provide a final version of the quantitative HAP destruction model within the next two days (i.e., by the close of business on Friday, September 17).

Commitment

While New-Indy does not believe that that there will be any issue with the handling of the foul condensate based on the modeling, it will be vigilant in monitoring the process and is committed to taking any and all steps necessary to minimize emissions and maintain compliance with applicable law during the stripper maintenance.

To that end, after the stripper maintenance is completed, New-Indy would like to conduct optimization trials to better determine the optimal configuration for the stripper to handle the foul condensate.

STEAM STRIPPER OPTIMIZATION TRIAL

Currently the Mill maximizes foul condensate flow to the steam stripper, with the remaining foul condensate flow going to the ASB (Attachment 1). The purpose of this proposed steam stripper optimization trial is to evaluate the capacity of the stripper to process 850 gpm of foul condensate. If successful, the trial will demonstrate that the steam stripper can treat a higher flow of foul condensate, which would allow a lower volume of foul condensate (and sulfide compounds) to be sent to the ASB for treatment.

Proposed Stripper Optimization Trial Configurations

Attachment 3 contains the technical details for the proposed steam stripper optimization trials.

Schedule

In response to community odor complaints, the Mill would like to proceed with the steam stripper maintenance the week of September 18-26, 2021. In early November, the Mill would like to begin the steam stripper optimization trials. The first series of steam stripper optimization trials will take place over the course of 5 days (trials 1-4). The Mill will provide notice to the Agency and public at least 48 hours prior to the start of trial activities.

Subpart S Compliance during the Stripper Optimization Trial

Currently, stripped condensate is sent for reuse to the brownstock washers, as allowed per 40 CFR § 63.446(e)(1). However, the volume of stripped condensate generated during the trial may exceed the volume that the brownstock washers can accept. Due to the high heat content of the stripped condensate, this stream cannot be sent to the ASB in the existing hardpipe without first passing through a heat exchanger. Any periods of conveyance in a non-closed system per 40 CFR § 63.446(d)(1)(2) will be reported in the Semi-Annual MACT report for July-December 2021.

Post-Trial

The Mill will submit a brief written summary to the Agency outlining the findings of the steam stripper optimization trial within 30 days of concluding the trials. Should the trials be deemed a success, the Mill will submit engineered drawings, process flow diagrams, and specifications for the optimized stripper configuration for Agency review and approval. The lead time to acquire a new heat exchanger for permanent installation is roughly 6 months.

If you have any questions, please contact me at 360.316.9677 or cody.hargrove@bwdesigngroup.com, or Mr. Dan Mallett with New-Indy at 803.981.8010 or dan.mallett@new-indycb.com.

Sincerely,

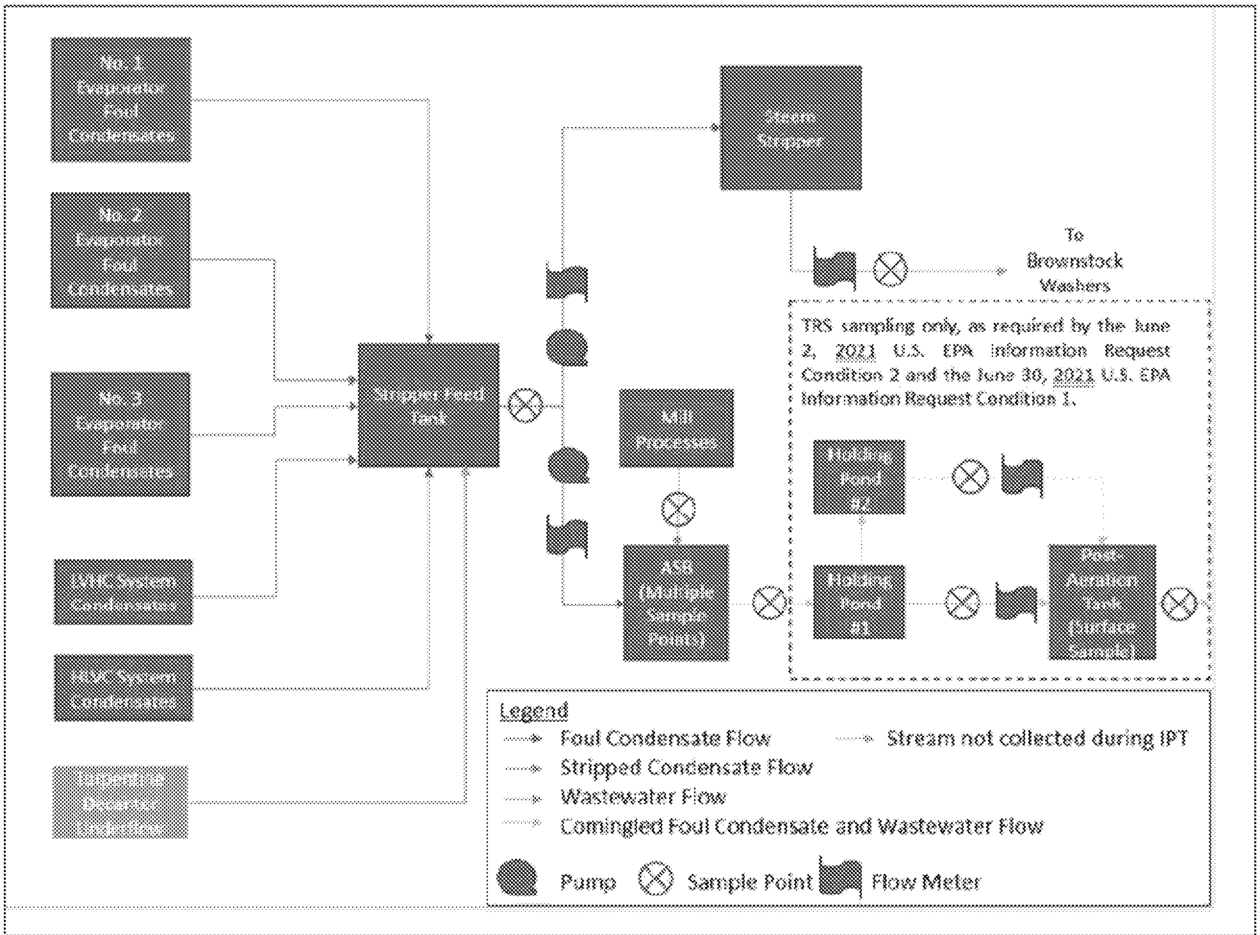
Cody Hargrove

Digitally signed by Cody Hargrove
DN: C=US, E=cody.hargrove@bwdesigngroup.com, OU=BW Design Group, CN=Cody Hargrove
Date: 2021.09.15 16:06:57-07'00'

Cody Hargrove
Project Manager

ATTACHMENT 1

Figure 1. Foul Condensate Collection and Treatment System Flow Diagram



ATTACHMENT 2

Hydrogen Peroxide Injection to Foul Condensate Hardpipe Sulfide Oxidation Calculations

	Total Foul Condensate Flow (MGD)[1]	Foul Condensate to Stripper (MGD)[1]	Foul Condensate to ASB (MGD)[1]	Foul Condensate Sulfide Concentration (ppm)[2]	Sulfide Amount in Total Foul Condensate flow (lbs/day)	Pounds of H2O2 at 50% needed to oxidize 1 lb of sulfide (as S^{2-})[3,4]	Minimum lbs/day of 50% H2O2 needed to treat 1008 lbs/day of sulfide	H2O2 Treatment Capacity for Sulfides when dosing 1 gpm	Units
7/9/21	1.04	0.71	0.33	**114**	**1008**	8.5	**8,566**	1	*gpm*
7/10/21	**1.06**	0.71	**0.35**	97	858			1440	*gpd*
7/11/21	1.04	0.71	0.33	47	408			9.98	*specific gravity 50% H2O2 in lbs*
Average	1.05	0.71	0.34	86	751			**14,372**	*lbs/day*
% split	100%	68%	32%						
GPM	729	493	236						

A hydrogen peroxide (50%) injection rate of 0.6 gpm (8,566 lbs/day) is adequate to oxidize the maximum anticipated sulfide load (1008 lbs/day) in the total foul condensate stream. The Mill plans to inject 1 gpm (14,372 lbs/day) of 50% hydrogen peroxide into the hardpipe for the oxidation of sulfides during the stripper shutdown.

Hydrogen Peroxide Dosing Assumptions:
Complete reaction of peroxide.
Peroxide reacts only with sulfides (no interference from other reactants).
Thorough and complete mixing takes place within the hardpipe line.

References

[1] Foul Condensate Flows for July 9-11, 2021. IPT July 2021, Tables G-1, G-2, G-4.
[2] Foul Condensate sulfide concentrations, July 9-11, 2021. CAP Condition 5 Air Dispersion Modeling Report, August 2021.
[3] 4 parts H2O2 to oxidize 1 part sulfide ion at pH > 8.5. From WEF MOP 25, p.120-121 (2020).

[4] Reaction Equation: S(2-) + 2O2 --> SO4
2H2O2 --> 2H2O + O2
4:1 H2O2:S (molar)
=4*34/32
4.25 lbs of 100% H2O2 needed to treat 1 lb of sulfide

ATTACHMENT 3
Steam Stripper Optimization Trial Configurations
Trials 1-4 are 6 hours in duration each

Trial 1: Design (2 Preheaters, 800gpm foul condensate processed with 77kpph of Steam)
- Effective Steam ratio: 16%
- Steam: 77kpph 160# Steam
- Foul Condensate Feed Flow: 800gpm
- Primary Goal: Demonstrate maximum efficiency removal of MeOH and TRS at 800gpm foul condensate feed rate.
- Secondary Goal:
  - To demonstrate how best to operate the system to maximize removal of HAPs and TRS at different foul condensate feed rates.
  - To gather data as needed for GAP analysis between design and current performance. Though we will have cleaned and repaired the system, it is possible or even likely that there are unknown smaller issues that need to be addressed to get us to design performance. We will be measuring temperatures with IR gun at certain points that will allow us to use the mass and energy balance model of the stripper to identify those GAPs.

Trial 2: Hybrid Operation (2 Preheaters, 850gpm foul condensate processed with 77kpph of Steam)
- Effective Steam Ratio: TBD by trial (Target between 6% and 16%)
- Steam: 77kpph 160# Steam
- Foul Condensate Feed Flow: 850gpm
- Primary Goal: To establish steady state operation at 850gpm FC feed rate and at the maximum steam ratio that the stripper can operate at, and test for TRS and MeOH removal efficiencies at those conditions.
- Secondary Goals:
  - To demonstrate how best to operate the system to maximize removal of HAPs and TRS at different foul condensate feed rates.
  - To gather data as needed for GAP analysis between design and current performance. Though we will have cleaned and repaired the system, it is possible or even likely that there are unknown smaller issues that need to be addressed to get us to design performance. We will be measuring temperatures with IR gun at certain points that will allow us to use the mass and energy balance model of the stripper to identify those GAPs.

Trial 3: Hybrid Operation (3 Preheaters, 850gpm foul condensate processed with 77kpph of Steam)
- Effective Steam Ratio: TBD by trial (Target between 6 and 16%)

- Steam: 77kpph 160# Steam
- Foul Condensate Feed Flow: 850gpm
- Primary Goal: Demonstrate higher steam ratio (and higher MeOH removal efficiencies) resulting from operating with 3rd preheater at foul condensate feed rate of 850gpm.
- Secondary Goals:
    - To demonstrate how best to operate the system to maximize removal of HAPs and TRS at different foul condensate feed rates.
    - To gather data as needed for GAP analysis between design and current performance. Though we will have cleaned and repaired the system, it is possible or even likely that there are unknown smaller issues that need to be addressed to get us to design performance. We will be measuring temperatures with IR gun at certain points that will allow us to use the mass and energy balance model of the stripper to identify those GAPs.

Trial 4: Design / 3 Preheaters (3 Preheaters, 800gpm foul condensate processed with 77kpph of Steam)

- Effective Steam Ratio: TBD by trial (Target >16%)
- Steam: 77kpph 160#
- Condensate Flow: 800gpm
- Primary Goal: Demonstrate higher steam ratio (and higher MeOH removal efficiencies) resulting from operating with 3rd preheater at foul condensate feed rate of 800gpm.
- Secondary Goals:
    - To demonstrate how best to operate the system to maximize removal of HAPs and TRS at different foul condensate feed rates.
    - To gather data as needed for GAP analysis between design and current performance. Though we will have cleaned and repaired the system, it is possible or even likely that there are unknown smaller issues that need to be addressed to get us to design performance. We will be measuring temperatures with IR gun at certain points that will allow us to use the mass and energy balance model of the stripper to identify those GAPs.